CLAIMS

1. Method for fabricating a bicycle wheel hub, comprising the following steps:

- providing an expandable core,
- applying a number of layers of structural fibre fabric incorporated in a plastic material matrix around the core to form a layered tubular body of predetermined shape and thickness around the core,
- arranging the core with the layered tubular body formed thereon in the cavity of a mould,
- increasing the temperature of the mould to a value sufficient to cause reticulation of the plastic material matrix,
- expanding the core for applying a pressure on the tubular body inside the mould, and
- removing the tubular body from the mould and from the core, so as to obtain a bicycle hub formed of a single piece of structural fibre material.

2. Method according to claim 1, wherein the increase of temperature of the mould and the expansion of the core occur substantially simultaneously.

3. Method according to claim 1, wherein the pressure on the tubular body caused by said expanding step is substantially radial.

4. Method according to claim 1, wherein a cooling phase is provided before removal of the tubular body from the mould.

5. Method according to claim 1, wherein the expandable core is made of a synthetic material presenting a thermal dilatation coefficient exceeding

$5x10^{-15}$ mm/°C and a maximum continuous heat resistance equal to at least 80°C, the expansion of the core being obtained through the dilation of the material forming the core when the temperature of the mould is increased.

6. Method according to claim 5, wherein the core has a thermal dilation coefficient exceeding $9x10^{-5}$ mm/°C and a maximum continuous heat resistance temperature exceeding 100°C.

7. Method according to claim 6, wherein the material forming the core is either PTFE, or PCTFE, or PVDF, or PE-HD.

8. Method according to claim 7, wherein the material forming the core is PTFE.

9. Method according to claim 1, wherein said structural fibres are selected among: carbon fibres, glass fibres, Kevlar fibres, or any combinations thereof.

10. Method according to claim 1, wherein said plastic material matrix is a thermosetting plastic material matrix.

11. Method according to claim 1, wherein said temperature is comprised in the range from 80°C to 200°C.

12. Method according to claim 11, wherein said temperature is maintained for a time comprised in the range from 10 minutes to three hours.

13. Method according to claim 12, wherein said temperature is maintained for a time comprised in the range from 30 minutes to three hours.

14. Method according to claim 1, wherein said core presents a cylindrical central section and two wider diameter end sections.

15. Method according to claim 1, wherein said core consists of two separate, axially contiguous elements, with a contact plane orthogonal to the axis of the core, in order to allow separation of the core from the tubular body after extraction from the mould.

16. Method according to claim 14, wherein also said tubular body is formed so as to present a cylindrical central section and two enlarged end sections (11, 12).

17. Method according to claim 14, wherein said tubular body presents a progressively increasing thickness from said central section towards the ends.

18. Method according to claim 14, wherein said tubular body has a central part of substantially constant section, end parts with substantially constant section, but larger that the central one and intermediate parts with increasing sections.

19. Method according to claim 14, wherein said two elements (3, 4) forming the core incorporate two end ring flanges (7, 8) to axially limit the ends of the pre-formed tubular body.

20. Method according to claim 1, wherein the expandable core includes a body of metal material

covered with a deformable sheath made of an elastomeric material, the expansion of the core being obtained through the dilation of the material forming the sheath when the temperature of the mould is increased.

21. Method according to claim 20, wherein the elastomeric material forming the aforesaid sheath has a thermal dilation coefficient exceeding $15x10^{-5}$ mm/°C and a maximum continuous heat resistance temperature exceeding 100°C.

22. Method according to claim 21, wherein the material forming the core is a synthetic rubber of the type marketed under the trademark AIRCAST 3700 by Airtech International Inc., Huntington Beach, California, USA.

23. Method according to claim 20, wherein the sheath is pre-formed according to the configuration of the core and is preferably dimensioned in order to be applied on the core by slightly stretching it so that the sheath adheres to the core due to its elasticity.

24. Method according to claim 1, wherein the layers of fabric on the core comprise one or more fabric strips wrapped around at least one axially limited portion of the core, as well as a plurality of fabric plies extending along the core axis.

25. Method according to claim 24, wherein at least some of said strips have cuttings on at least one lateral edge thereof.

26. Method according to claim 24, wherein at least some of said strips have extensions on at least

one lateral edge thereof.

27. Method according to claim 24, wherein at least some of said strips have a combination of cuttings and extensions on at least one lateral edge thereof .

28. Method according to claim 25, wherein said cuttings are triangular.

29. Method according to claim 25, wherein said cuttings are rectangular.

30. Method according to claim 25, wherein said cuttings are rectilinear

31. Method according to claim 24, wherein at least some of said strips and at least some of said plies are applied on the core alternated to each other.

32. Method according to claim 31, wherein at least one of said strips is wrapped around each end portion of said core

33. Method according to claim 31, wherein at least one of said strips is wrapped around an intermediate portion of said core.

34. Method according to claim 31, wherein at least some of said plies extend for the entire length of the core.

35. Method according to claim 31, wherein at least some of said plies cover the core only partly in the circumferential direction.

36. Method according to claim 35, wherein said

plies are applied on different sides of the core for forming a complete layer on the core.

37. Method according to claim 36, wherein the plies are applied in pairs on diametrically opposite sides of the core.

38. Method according to claim 37, wherein different pairs of plies are applied so as to be angularly spaced relative to each other on the core.

39. Method according to claim 38, wherein two pairs of diametrically opposite plies are applied spaced by 90° relative to each other.

40. Method according to claim 1, wherein the expandable core includes a body of metal material including a number of circumferentially arranged separate sectors, the expansion of the core being obtained through a radially outward movement of said sectors.

41. Apparatus for fabricating a bicycle wheel hub comprising:

- a mould with a cylindrical cavity,
- an expandable core, on which a number of layers of structural fibre fabric incorporated in a plastic material matrix are applied to form a layered tubular body, of predetermined shape and thickness,
- means for increasing the temperature of the mould to a value sufficient to cause the reticulation of the plastic material matrix, and
- means to cause an expansion of the core, determining the application of a pressure on the tubular body inside the mould.

42. Apparatus according to claim 41, wherein said core presents a cylindrical central section and two wider diameter end sections and includes two separate, axially contiguous elements, with a contact plane orthogonal to the axis of the core, in order to allow separation of the core from the tubular body after extraction from the mould,

43. Apparatus according to claim 42, wherein said apparatus further includes spring means for elastically pressing said two elements forming the core one against the other.

44. Apparatus according to claim 43, wherein it comprises a cylindrical cavity closed by two caps each comprising a respective helical spring, which is axially interposed between the cap and the respective element of said core.

45. A bicycle wheel hub which is obtained with a method according to any of claims 1-40.

46. Method for fabricating a bicycle wheel hub, comprising the following steps:

- providing an expandable core,
- applying a number of layers of structural fibre fabric incorporated in a plastic material matrix around the core to form a layered tubular body of predetermined shape and thickness around the core,
- arranging the core with the layered tubular body formed thereon in the cavity of a mould,
- increasing the temperature of the mould to a value sufficient to cause reticulation of the plastic material matrix,

- expanding the core for applying a pressure on the tubular body inside the mould, and

- removing the tubular body from the mould and from the core, so as to obtain a bicycle hub formed of a single piece of structural fibre material,

wherein the expandable core is made of a synthetic material presenting a thermal dilatation coefficient exceeding $5x10^{-15}$ mm/°C and a maximum continuous heat resistance equal to at least 80°C, the expansion of the core being obtained through the dilation of the material forming the core when the temperature of the mould is increased.

47. Method for fabricating a bicycle wheel hub, comprising the following steps:

- providing an expandable core,

- applying a number of layers of structural fibre fabric incorporated in a plastic material matrix around the core to form a layered tubular body of predetermined shape and thickness around the core,

- arranging the core with the layered tubular body formed thereon in the cavity of a mould,

- increasing the temperature of the mould to a value sufficient to cause reticulation of the plastic material matrix,

- expanding the core for applying a pressure on the tubular body inside the mould, and

- removing the tubular body from the mould and from the core, so as to obtain a bicycle hub formed of a single piece of structural fibre material,

wherein the expandable core includes a body of metal material covered with a deformable sheath made of an elastomeric material, the expansion of the core being obtained through the dilation of the material forming the sheath when the temperature of the mould is

increased.

48. Method for fabricating a bicycle wheel hub, comprising the following steps:

- providing an expandable core,
- applying a number of layers of structural fibre fabric incorporated in a plastic material matrix around the core to form a layered tubular body of predetermined shape and thickness around the core,
- arranging the core with the layered tubular body formed thereon in the cavity of a mould,
- increasing the temperature of the mould to a value sufficient to cause reticulation of the plastic material matrix,
- expanding the core for applying a pressure on the tubular body inside the mould, and
- removing the tubular body from the mould and from the core, so as to obtain a bicycle hub formed of a single piece of structural fibre material

wherein the layers of fabric on the core comprise one or more fabric strips wrapped around at least one axially limited portion of the core, as well as a plurality of fabric plies extending along the core axis.

49. Method for fabricating a bicycle wheel hub, comprising the following steps:

- providing an expandable core,
- applying a number of layers of structural fibre fabric incorporated in a plastic material matrix around the core to form a layered tubular body of predetermined shape and thickness around the core,
- arranging the core with the layered tubular body formed thereon in the cavity of a mould,
- increasing the temperature of the mould to a

value sufficient to cause reticulation of the plastic material matrix,

- expanding the core for applying a pressure on the tubular body inside the mould, and

- removing the tubular body from the mould and from the core, so as to obtain a bicycle hub formed of a single piece of structural fibre material.

wherein the expandable core includes a body of metal material including a number of circumferentially arranged separate sectors, the expansion of the core being obtained through a radially outward movement of said sectors.